Claims: We claim:

1. An ion or charged particle transmission **device at or near atmospheric pressure** for delivery of charged material to a deposition or reaction surface, said device comprising;

   a) a near atmospheric pressure ion or charged particle source,

   b) a high transmission electrode surface that controls the passage efficiency and spatial distribution of said charged material through said surface and into an ion beam creation optics region,

   c) optics in said ion beam creation region with associated power supplies to generate a collimated beam of charged material,

   d) a material collection surface held at or near atmospheric pressure at a lower electrical potential than said ion source and said high transmission electrode to enable attraction and deposition to said collection surface;

   whereby, the delivery of said charged material from said source has precisely controlled spatial distribution, temporal deposition, composition, and energy.

2. A device as described in claim **1** wherein said high transmission electrode further comprises a 3-dimensional conformal mask for atmospheric pressure high-resolution patterns.

3. A device as described in claim **1** wherein said high transmission electrode further comprises a 2-dimensional or a 3-dimensional shadow mask for highly efficient atmospheric ion pattern printing.

4. A device as described in claim **1** wherein said high transmission electrode further comprises a selectable lenses dispersed within the surface of said high transmission element for maskless ion pattern printing.

5. A device as described in claim **4** wherein said selectable lenses further comprises variable elements to control the density and concentration of

said charged material delivered to said material collection surface providing gray-scaling capabilities.

6. A device as described in claim **1** further comprises a computer or controller to provide spatial and electric potential control of said ion source, high transmission element, optics, material collection surface or combination thereof.

7. A device as described in claim **1** wherein said material collection surface further comprises a non-photoconductive semiconductive surface for collection of said charged material.

8. A device as described in claim **1** wherein said ion source further comprises an atmospheric ion or particle printer that deposits specific inorganic, organic, biomolecular, or cellular materials onto the said collection surface.

9. A device as described in claim **1** wherein said ion source further comprises a heterogeneous matter printer for 2-dimensional and 3-dimensional matter forms creation.

10. An ion or charged particle transmission **device** for delivery of charged material to a deposition or **reaction surface at reduced pressures**, said device comprising;

    a) a near atmospheric pressure ion or charged particle source,

    b) a high transmission electrode surface at or near atmospheric pressure that controls the efficiency of passage and spatial distribution of said charged material through said surface into a beam creation optics region,

    c) beam creation optics in said beam creation optics region at or near atmospheric pressure to generate a collimated beam of said charged material,

d) a conductance aperture or tube, or an array of apertures and tubes, to enable transmission of said charged material from said ion source into a lower pressure deposition region,

e) one or more stages of pressure reduction with ion optics, ion guides, or a combination thereof to transfer said charge material into said lower pressure region;

f) ion beam control optics in said lower pressure region downstream of said pressure reduction,

g) a positionally static or movable material collection surface in said lower pressure regions downstream of said low pressure ion beam control optics said collection surface at a lower electrical potential than said low pressure optics to enable attraction and deposition of said charged material to said collection surface;

whereby, the delivery of said charged material from said source is precisely controlled in terms of spatial distribution, temporal disposition, composition, and energy.

11. A device as described in claim **10** wherein said high transmission element further comprises a 2-dimensional or 3-dimensional shadow mask for highly efficient atmospheric ion pattern printing.

12. A device as described in claim **10** wherein said high transmission element comprises a selectable digital ion lens dispersed within, on the surface or a combination thereof of said high transmission element for maskless ion pattern printing.

13. A device as described in claim **10** wherein said high transmission surface further comprises a variable lens dispersed within or on the surface of said high transmission element to control the density and concentration of material delivered to said material collection surface to provide gray-scale intensity capabilities.

14. A device as described in claim **10** wherein said material collection surface further comprises a non-photoconductive semiconductive surface for collection of said charged material.

15. A device as described in claim **10** wherein said ion source further comprises an atmospheric ion or particle printer that deposits specific inorganic, organic, biomolecular, or cellular materials onto the said collection surface.

16. A device as described in claim **10** wherein said ion source further comprises a heterogeneous matter printer for 2-dimensional and 3-dimensional matter forms creation.

17. A device as described in claim **10** further comprises computer control of electric potentials and spatial orientation of said ion source, high transmission electrode surface, beam reaction optics, conductive aperture or tube, pressure reduction and lower pressure optics, material collection surface, or combinations thereof providing nano-, micro-, and macro-printing capacities.

18. A device as described in claim **10** wherein said beam creation optics further comprises funnel-well optics supplied with DC electrostatic potentials to generate a collimated beam of said charged material.

19. An ion or charged particle transmission **device at or near atmospheric pressure** for delivery of charged material to a deposition or reaction surface, said device comprising;

a) a near atmospheric pressure ion or charged particle source,

b) a high transmission electrode surface at that controls the passage efficiency and spatial distribution of said charged material through said surface and into a funnel-well region,

c) funnel-well optics with associated power supplies in funnel-well region to generate a collimated ion beam of said charged material,

d) a positionally static or movable material collection surface held at a lower electrical potential than said ion source enabling attraction and deposition of said charged material onto said collection surface;

whereby, the delivery of said charged material from said source has precisely controlled spatial distribution, temporal deposition, composition, and energy.

20. A device as described in claim **19** wherein said high transmission element further comprises a 3-dimensional conformal mask for atmospheric pressure high-resolution patterns.

21. A device as described in claim **19** wherein said high transmission element further comprises a 2-dimensional or 3-dimensional shadow mask for highly efficient atmospheric ion pattern printing.

22. A device as described in claim **19** wherein said high transmission electrode further comprises selectable variable lenses dispersed within the surface of said high transmission element for maskless ion pattern printing.

23. A device as described in claim **19** wherein further comprises a computer to control electrical potentials and spatial orientation of said ion source, high transmission electrode, beam creation optics, reduced pressure optics, or combinations thereof to control the density and concentration of said charged material delivered deposited on said material collection surface.

24. A device as described in claim **19** wherein said material collection surface further comprises a non-photoconductive semiconductive surface for collection of charged material.

25. A device as described in claim **19** wherein said ion source further comprises an atmospheric ion or particle printer that deposits specific inorganic, organic, biomolecular, or cellular materials onto the said collection surface.

26. A device as described in claim **19** wherein said ion source further comprises a heterogeneous matter printer for 2-dimensional and 3-dimensional matter forms creation.

27. A **method** of delivering charged material, such as ions or charged particles to a deposition or reaction surface **at or near atmospheric pressure**, said method comprising;

a) generating ions or charged particles in a charged material source;

b) transmitting said charged material through a high transmission surface in order to control composition, spatial distribution, and temporal transmission profile into focusing region;

c) providing a means of focusing transmitted said charged material once said material pass through said high transmission surface;

d) providing a means of collimating focused charged material into precisely defined beams,

e) depositing and reacting said charged material on a positionally static or movable deposition surface;

whereby, the delivery of said charged material from said source has precisely controlled spatial distribution, temporal deposition, composition, and energy.

28. A method as described in claim **27** wherein said high transmission surface is further comprises a 2-dimensional, 3-dimensional shadow mask, or a combination thereof, to provide highly efficient atmospheric ion pattern printing.

29. A method as described in claim **27** wherein said high transmission surface is further comprises of a selectable digital ion lens dispersed within said high transmission surface to provide maskless ion pattern printing.

30. A method as described in claim **27** wherein said high transmission surface, is further comprises of a selectable variable ion lens dispersed

within or on top of said high transmission surface to provide to provide gray-scale printing capabilities.

31. A method as described in claim **27** wherein a computer controls the electric potentials of said ion source, said high transmission surface, focusing means, collimating means, deposition surface or combinations thereof, to provide passage of charged material through said high transmission surface for enhanced matter etching, matter deposition, and matter nanolithography.

32. A method a described in claim **27** wherein the material deposited on the said collection surface is further processed by moving the position of the deposited material to a remote location from the ion beam and reacting the material with additional reactants, light, or heat.

33. A **method** of producing **a structure** by delivering charged material, such as ions or charged particles to a deposition or reaction surface, said method comprising;

a) generating ions or charged particles in a charged material source at or near atmospheric pressure;

b) transmitting said charged material through a high transmission surface at or near atmospheric pressure in order to control composition, spatial distribution, and temporal transmission profile into focusing region;

c) providing a means at or near atmospheric pressure of focusing transmitted said charged material once said material pass through said high transmission surface;

d) providing a means at or near atmospheric pressure of collimating focused charged material into precisely defined beams,

e) depositing and reacting said charged material on a deposition surface;

whereby, the delivery of said charged material from said source has precisely controlled spatial distribution, temporal deposition, composition, and energy resulting in the deposition of said material and the production of said structure.

34. A method as described in claim **33** wherein said structure is formed at greatly reduced pressures by maintaining said deposition surface at reduced pressures by means of a vacuum chamber.

35. A method as described in claim **33** wherein said structure is formed at or near atmospheric pressure by maintaining said deposition surface at or near atmospheric pressure.

36. A method as described in claim **33** wherein said structure is formed by a series of temporally or spatially separated steps in order to achieve the desired spatial and compositional resolution of the said structure.